

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
17 March 2005 (17.03.2005)

PCT

(10) International Publication Number
WO 2005/024240 A3

(51) International Patent Classification⁷: **G01F 1/78**,
F04D 15/00, G01D 5/14

(21) International Application Number:
PCT/EP2004/009668

(22) International Filing Date: 30 August 2004 (30.08.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
03425571.1 4 September 2003 (04.09.2003) EP

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,

CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

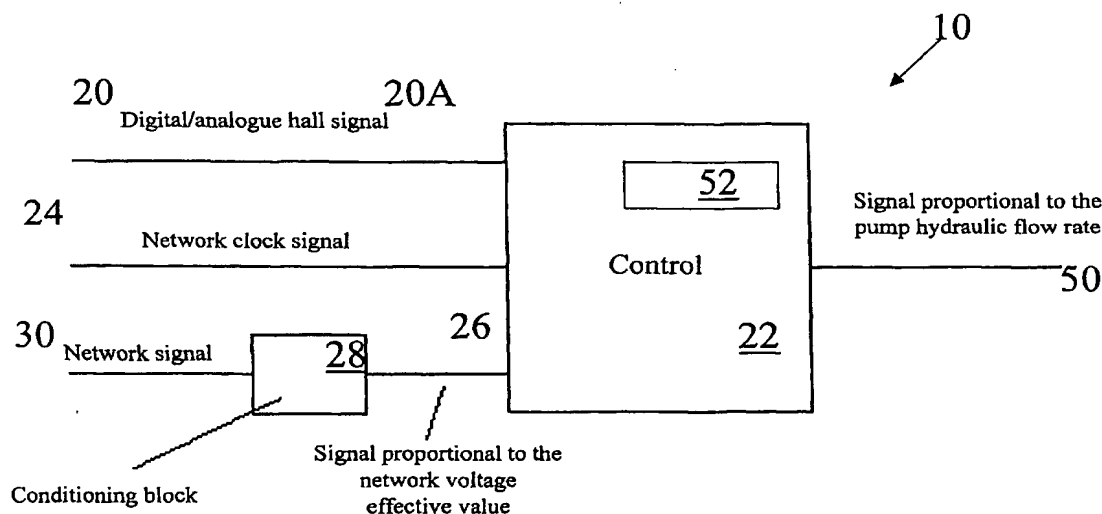
Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:
2 June 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHOD AND DEVICE FOR DETERMINING THE HYDRAULIC FLOW RATE IN A PUMP



(57) Abstract: The present invention relates to a method and relevant electronic device (10) for determining the hydraulic flow rate in a pump driven by a synchronous electric motor (12), said motor (12) being of the type comprising a rotor (14), equipped with a permanent magnet, which is rotation-driven by the electromagnetic field generated by a stator (16) equipped with pole pieces (18) with relevant windings. The method comprises an indirect measuring of the flow rate through the following steps of: acquiring at least one pump operation variable; -comparing the value of said variable with a predetermined correlation table to hydraulic flow rate values and determining a corresponding flow rate value.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2004/009668

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G01F1/78 F04D15/00 G01D5/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G01D G01F F04D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 971 212 A (SULZER ELECTRONICS AG ; LUST ANTRIEBSTECHNIK GMBH (DE)) 12 January 2000 (2000-01-12) sentence 3 - sentence 5 page 4, line 23 - line 28 page 7, line 30 - page 8, line 7 page 8, line 35 - page 9, line 21	1, 3-5, 8, 9
A	US 4 781 525 A (CLAUSEN EARL W ET AL) 1 November 1988 (1988-11-01) column 2, line 35 - column 3, line 39	1-4
A	DE 44 18 721 A (LICENTIA GMBH) 30 November 1995 (1995-11-30) figure W	1-12



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Patent family members are listed in annex.

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Date of the actual completion of the international search

11 March 2005

Date of mailing of the international search report

21/03/2005

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP2004/009668

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0971212	A	12-01-2000	EP 0971212 A1	12-01-2000
			US 6634224 B1	21-10-2003
US 4781525	A	01-11-1988	NONE	
DE 4418721	A	30-11-1995	DE 4418721 A1	30-11-1995